

Projecting literacy skills using microsimulation models: tools to better inform social and immigration policies

Samuel Vézina Institut national de la recherche scientifique (INRS)
Alain Bélanger Institut national de la recherche scientifique (INRS) &
International Institute for Applied Systems Analysis (IIASA)



4th International PIAAC Conference
Parallel sessions – Workshop 2
November 23 2017, Singapore

A new demographic regime

Main research question

How future education and immigration levels will impact the size and the skills of the future workforce?

- Immigration has reached historical level
 - Immigration has become increasingly culturally diverse
 - Older workers are replaced by more educated young cohorts
- Numerous policy consequences
- Long-term sustainability of social security programs (healthcare, pension plans)
 - Political outcomes, immigration and integration policies ...

A new demographic regime

- New policy tools are needed
 - Social cohesion
 - Labour market needs and changes
 - Poverty and inequalities
 - Education and language skill formation
- Microsimulation models
- Human capital and Knowledge-based economies
 - PIAAC - Survey on Adult Skills

Microsimulation

- What is it?
 - Departure from deterministic macro models
 - The individual, not the aggregate, is the unit being simulated
 - A population is therefore simulated one unit at a time
 - State transitions are determined stochastically
- Why the buzz?
 - A very significant technical improvement over multistate methodology
 - Extremely flexible in its implementation
 - Though, dependent on available data

Microsimulation

Research

Synthesis

Integration

Trend analysis / Input

- **Demographic**
 - Fertility
 - Mortality
 - Migration
- **Ethnocultural**
 - Country of birth
 - Age at immigration
 - Length of stay
 - Generation
 - Language
 - Race
- **Socio-economic**
 - Highest level of education
 - Age at graduation
 - Labour force participation
 - Literacy skills

Scenarios

- **Immigration**
 - Level
 - Composition
- **Changes in behaviors**
 - Education
 - Work intensity
- **What if scenarios**

Model

General Indicators

- Population composition by age, sex, education, immigration status, language and skills

Integration Indicators

- % active
- Male/Female LFP
- Literacy skills
- Language use
- ...

Focus

- Two developed countries: Austria and Canada
 - Different immigration contexts
 - Different education contexts
- Workforce: 25 to 64 years old
- Microsimulation models
 - *PÖB* (Austria)
 - *LSD-C* (Canada)
- Projections 2011 – 2061
- Open to migration

Descriptive statistics

Total population aged 25 to 64 years old, 2012

		Austria	Canada
Proportion of university graduates	Native-born	19 %	22 %
	Foreign-born	24 %	35 %
Proficiency in literacy skills (Mean score)	Native-born	275	276
	Foreign-born	245	249
Proportion economically active	Native-born	80 %	82 %
	Foreign-born	74 %	78 %
Population (N)	Native-born	3,749,100	14,205,500
	Foreign-born	914,900	4,658,600

Projection Scenario Assumptions

Scenario	Immigration volume	Immigration composition	Education	Activity rates
REFERENCE	Official immigration volume projected by National Statistical agencies	<u>Austria:</u> Characteristics of immigrants arrived in 2011-2016 <u>Canada:</u> Characteristics of immigrants arrived between 2006-2010	Recent trends reflecting the observed rise of educational attainment of cohorts	Recent trends

Immigration rate

Canada: 0.75% (Among the world's highest rate)

Austria: Refugee Crisis, back to 0.25% by 2026.

Projection Scenario Assumptions

Scenario	Immigration volume	Immigration composition	Education	Activity rates
COMPARABLE	Immigration rate set at 0.35%	Characteristics of immigrants arrived between 2006-2010	Educational attainment set at observed rate in 2011	Recent trends
ZERO	No immigration	Characteristics of immigrants arrived between 2006-2010	Educational attainment set at observed rate in 2011	Recent trends

Immigration rate
0.35% is equal to the US level.

Projection Scenario Assumptions

Scenario	Immigration volume	Immigration composition	Education	Activity rates
EDUCATION	Immigration rate set at 0.35%	Characteristics of immigrants arrived between 2006-2010	Recent trends reflecting the observed rise of educational attainment of cohorts	Recent trends

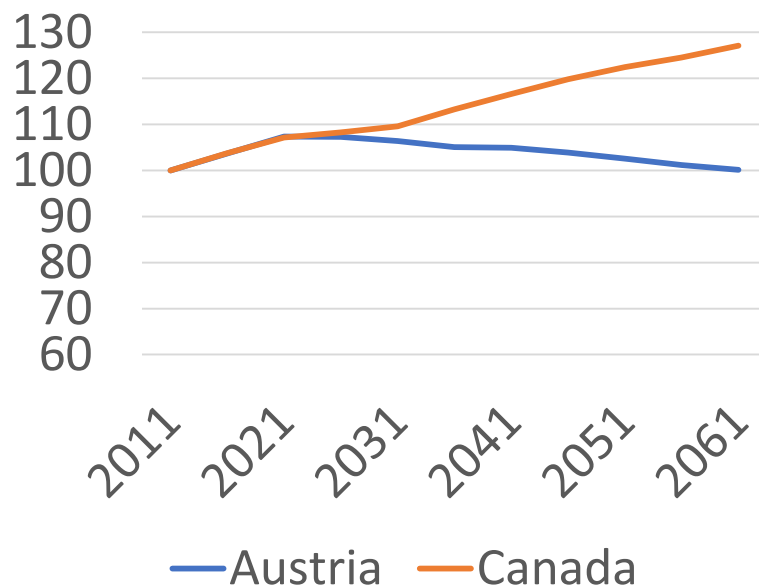
Projection Scenario Assumptions

Scenario	Immigration volume	Immigration composition	Education	Activity rates
CHARACT	Official immigration volume projected by National Statistical agencies	<u>Austria:</u> Characteristics of immigrants arrived in 2015-2016 <u>Canada:</u> Immigrants come in with more “literacy-oriented” characteristics in terms of age, education, language skills and country of highest diploma	Educational attainment set at observed rate in 2011	Recent trends

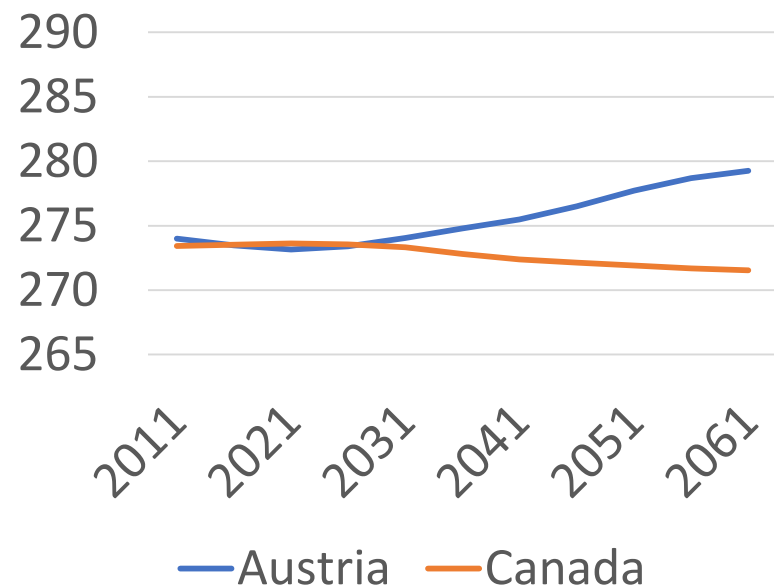
REFERENCE Scenario

Size of the workforce

(base 100 in 2011)



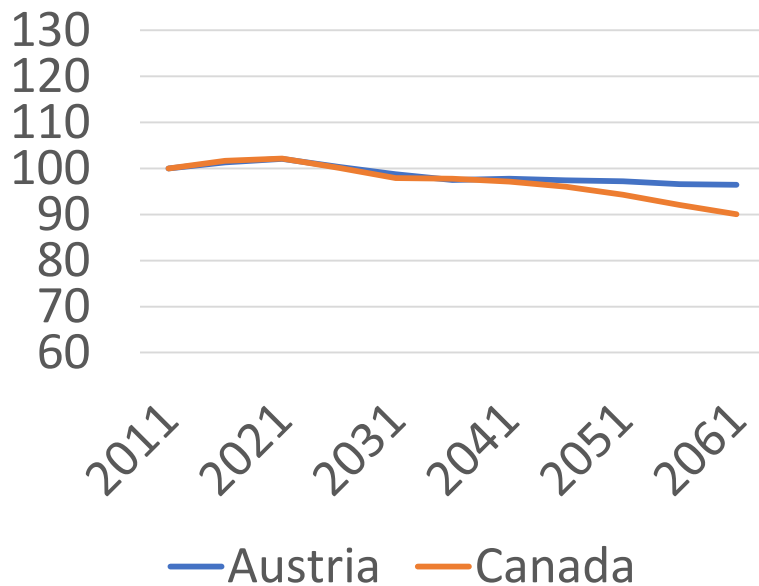
Average literacy score of the workforce



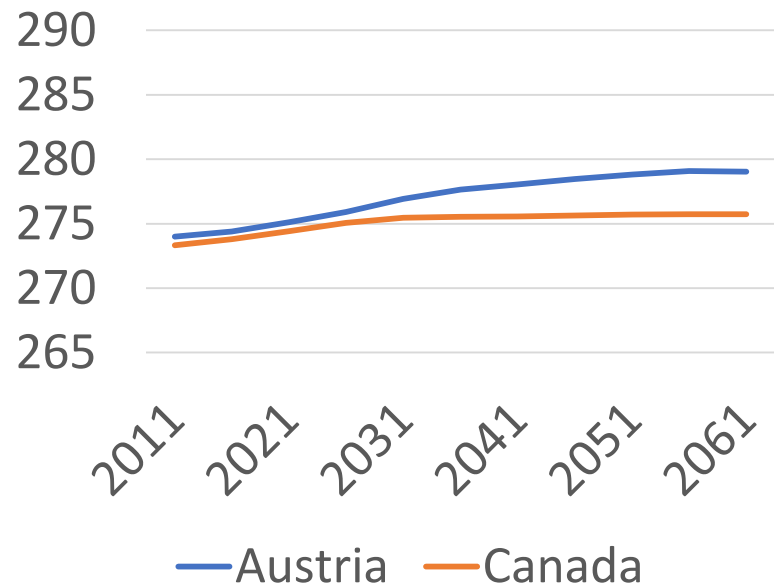
COMPARABLE Scenario

Size of the workforce

(base 100 in 2011)



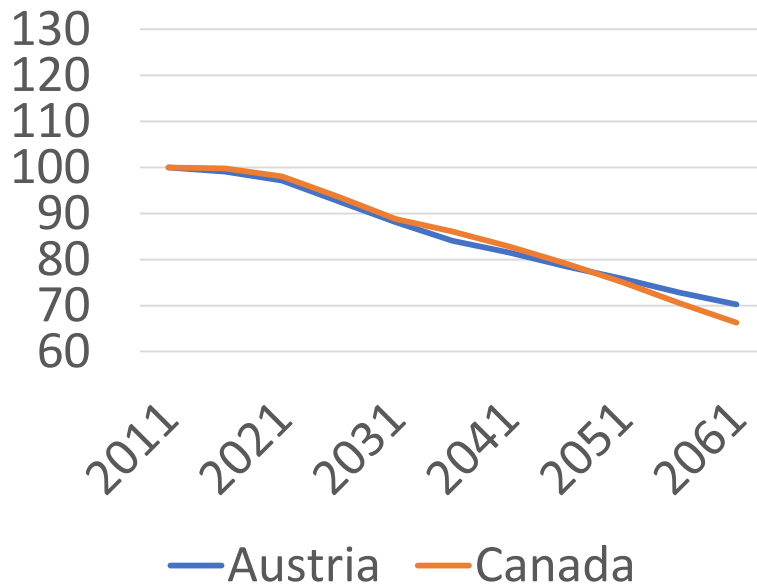
Average literacy score of the workforce



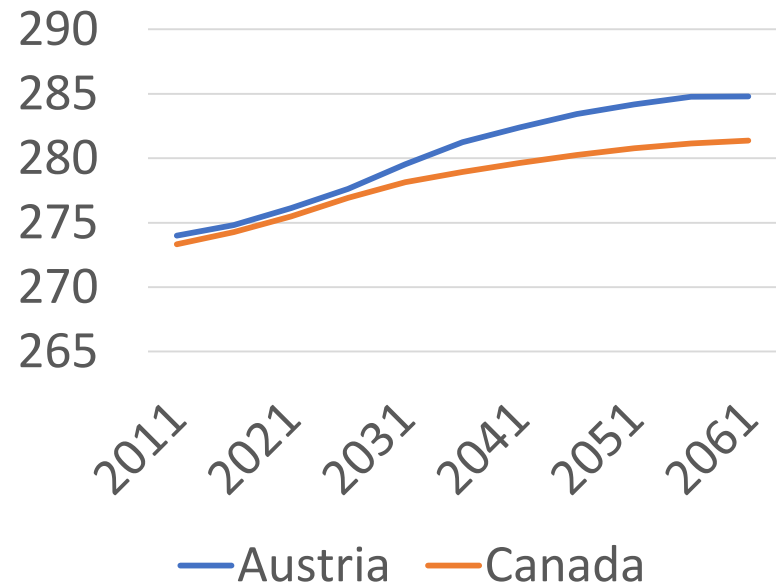
ZERO Scenario

Size of the workforce

(base 100 in 2011)



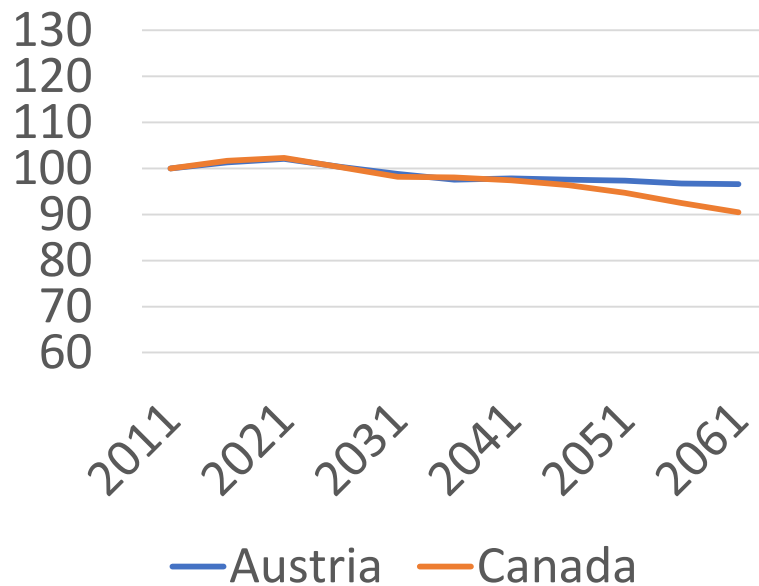
Average literacy score of the workforce



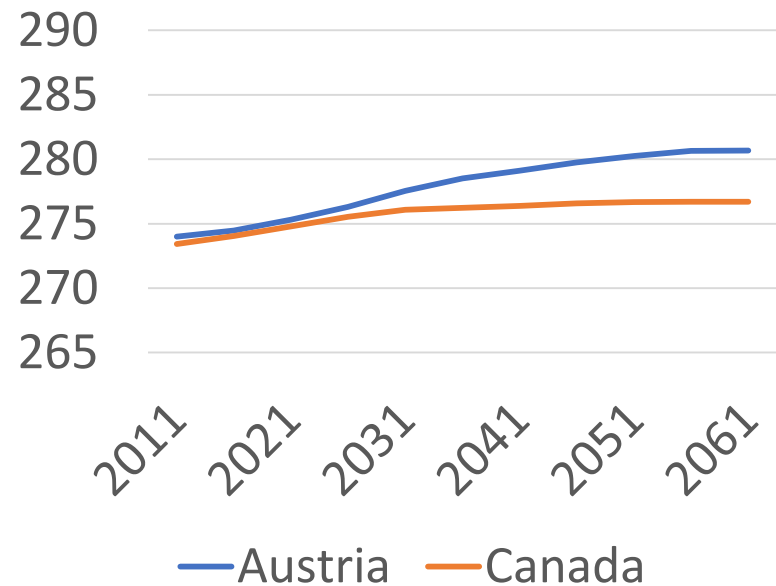
EDUCATION Scenario

Size of the workforce

(base 100 in 2011)



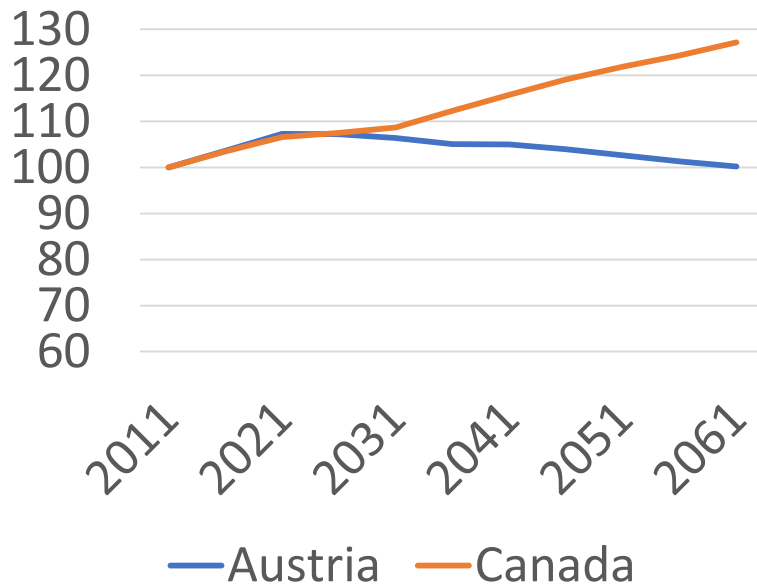
Average literacy score of the workforce



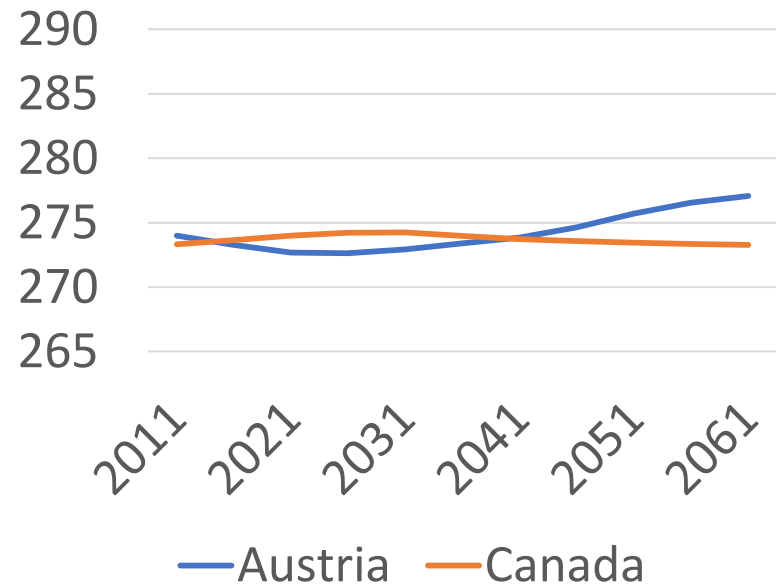
CHARACT Scenario

Size of the workforce

(base 100 in 2011)



Average literacy score of the workforce



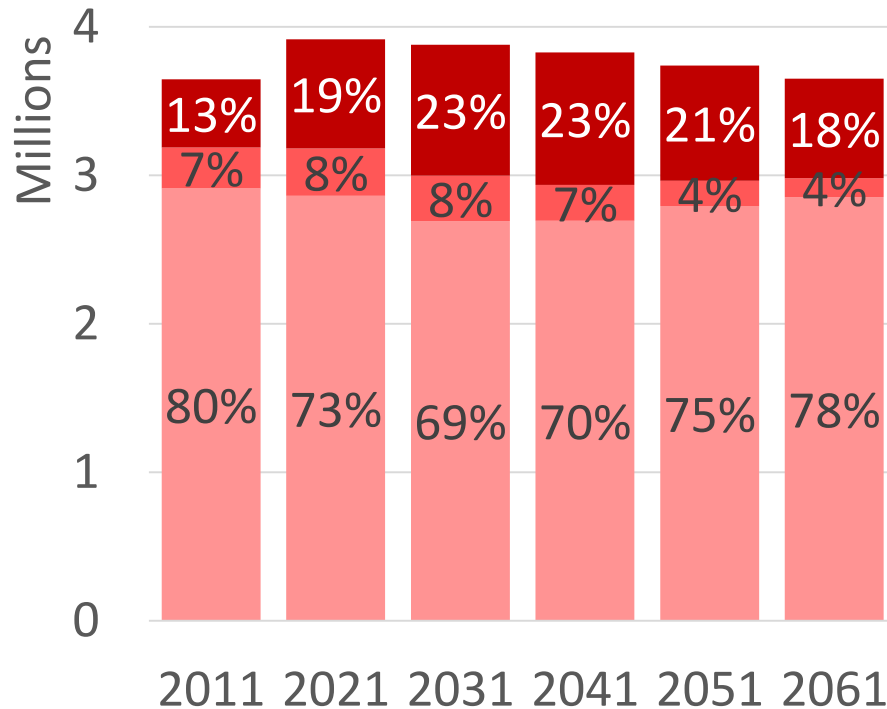
In a nutshell

- The demographic dynamic, the natural growth rate of the workforce is similar in both Austria and Canada
- Future positive growth of the workforce relies heavily on immigration intakes
- Immigration also impacts on average skills
- Education have no significant impact on the size of the future workforce
- Education impacts on average skills
- Divergent strategies in terms of future development of the workforce

Implications - Austria

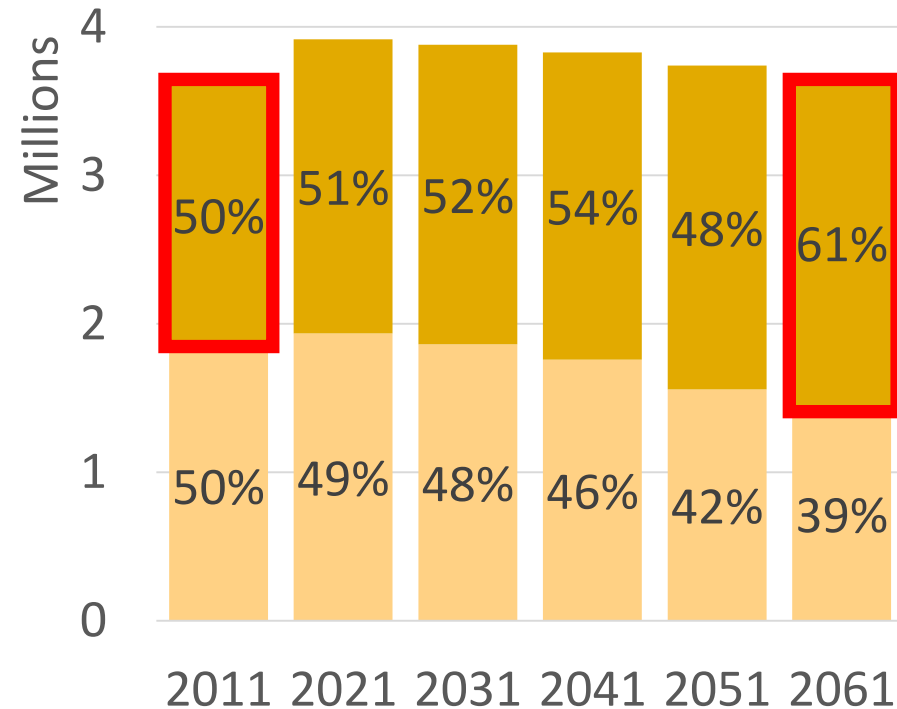
Workforce aged 25 to 64 years old, 2011-2061, REFERENCE Scenario

By immigration status and country of birth



- Foreign-born (less developed countries)
- Foreign-born (most developed countries)
- Native-born

By literacy level

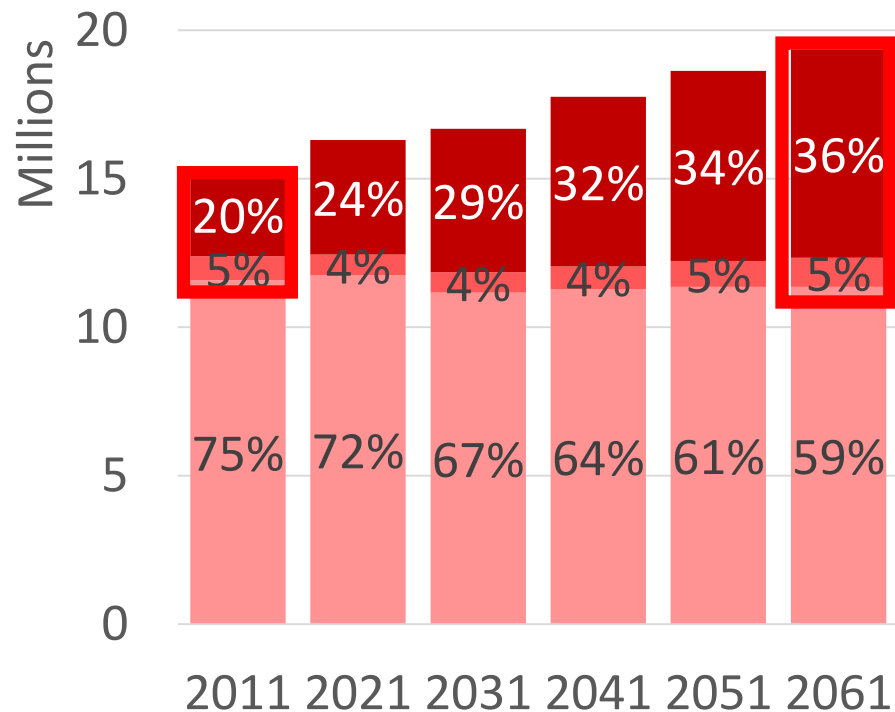


- Medium or high literacy level (Level 3 or over)
- Low literacy level (Level 2 or below)

Implications - Canada

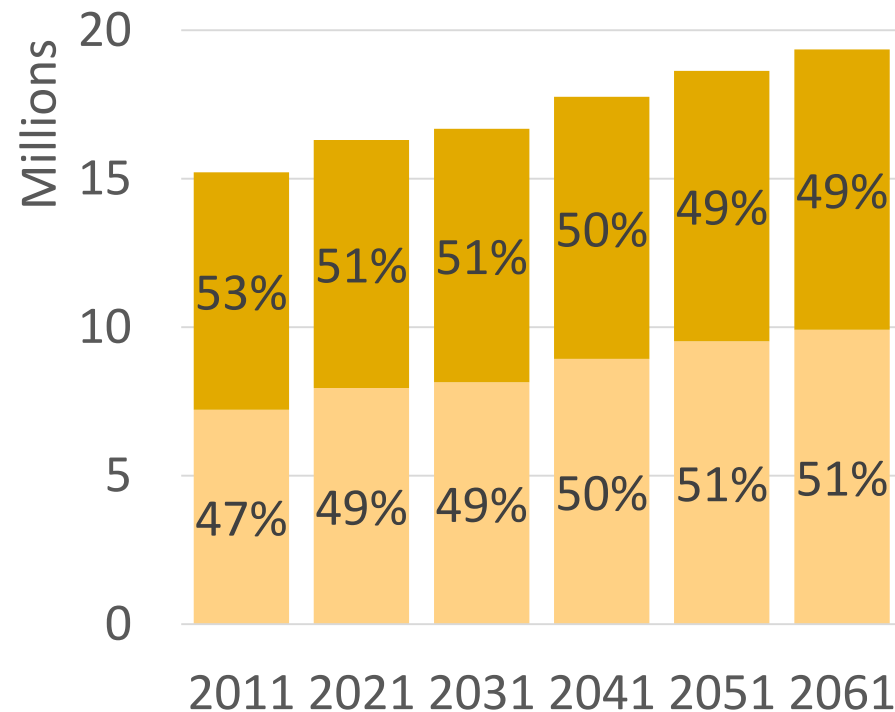
Workforce aged 25 to 64 years old, 2011-2061, REFERENCE Scenario

By immigration status and country of birth



- Foreign-born (less developed countries)
- Foreign-born (most developed countries)
- Native-born

By literacy level



- Medium or high literacy level (Level 3 or over)
- Low literacy level (Level 2 or below)

Implications for policy

How to close the skill gap between foreign-born and native-born ?

1. Integration policies

- Lifelong training
- Language skills

2. Immigration policies

- Selection based on skills

Thank you !

- Samuel Vézina
samuel.vezina@ucs.inrs.ca
- Alain Bélanger
alain.belanger@ucs.inrs.ca
belanger@iiasa.ac.at